



# Management and socio-economic conditions of fishermen of the Baluhar Baor, Jhenaidah, Bangladesh

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## Abstract

This study was conducted on the management of the Baluhar Baor and fishermen's socio-economic conditions of the *baor* in Jhenaidah district, Bangladesh. Data were collected by interviews, FGDs and CIs with key informants. This *baor* was managed under Oxbow Lake Project-1 of Department of Fisheries of Bangladesh government. *Hypophthalmichthys molitrix*, *Labeo rohita*, *Catla catla*, *Cirrhina cirrhosus*, *Cyprinus carpio* and *Ctenopharyngodon idella* were commonly stocked at the composition of 34%, 13%, 12%, 12%, 15% and 14%, respectively. *Kochal*, *komor* and *chack* fishing were used for harvesting and yearly production was 750 kg/ha. While studying the socio-economics, 58% fishermen were lived in joint families. 78% fishermen used *kancha* sanitary latrine which reflects their poor hygienic condition but they used tubewell for drinking water. 58% fishermen were with 0.041 hectare lands and 74% lived in *kancha* house. The annual income varied from BDT 15,000 to 60,000. Education level was found very low and only 18% completed their primary education. Majority fishermen (82%) visited village doctor for health services due to low income and lack of knowledge. All fishermen were fully dependent on *baor* fishery for their livelihood. It is possible to uplift their socio-economic by managing the *baor* with improved technology.

**Keywords:** Baluhar Baor, management, socio-economic conditions, fishermen

## INTRODUCTION

Bangladesh is fortunate in having an extensive water resource in the form of ponds, natural depressions (*haors* and *beels*), huge floodplain, lakes, canals, rivers and estuaries covering an area of 4.56 million ha (DoF 2011). Among the vast inland fishery resources, *baor* (oxbow lakes) are more potential. *Baors* are one of the very common inland water bodies in the study area. It is the dead arm of a river in the moribund delta as in the case of the Ganges. It appears as a saucer shaped depression familiar in the southwestern part of Bangladesh. *Baors* are more stagnant than *beels* and generally have water throughout the year. *Baors* are

considered to be very important wetlands of Bangladesh and support a wide range of aquatic lives *i.e.* flora and fauna. Relatively higher peripheral lands along the *baors* are used for cultivating paddy and for grazing livestock (Banglapedia 2011).

There are about six hundred oxbow lakes in four greater districts of Jessore, Faridpur, Khulna and Kustia having many of these concentrations in greater Jessore district (Hasan 2003 and Biswas *et al.* 2009). The total estimated area of *baor* in Bangladesh is 8556 ha (DoF 2011). The production from culture fisheries is at present in a satisfactory level but actually there is no management involved in capture fisheries which is vast and potential.

The average rate of production from *baor* 633kg/ha which can be increased manifold (DoF 2011).

*Baors* are very good natural habitat of large and small indigenous fishes of different food habits. Many of the fish and prawn species can multiply in number in *baors*. People living in village around the *baors* harvest the fish almost round the year without any prior investment except catching devices. A large portion of rural families are engaged in part time fish capture from the floodplains.

In view of the growing poverty and inequality among the people dependent on the fisheries sector, initiatives were taken to improve fisheries management through involvement of the fishermen. The socio-economic conditions in which the fisher folk live create problems of access to water bodies and deprive the under privileged people of available resources. In the fishing areas, there are limited alternative livelihood opportunities for the poor, who predominantly depend on fishing. The main objectives of fisheries management is the conservation of fish stocks. In modern fisheries management, it includes economic, social and environmental objectives such as fishers' welfare, economic efficiency, the allocation of resources and environmental protection.

Considering the above circumstances, the present research was conducted to understand the management of the *baor* and to assess the socio-economic condition of the fishers around the Baluhar Baor.

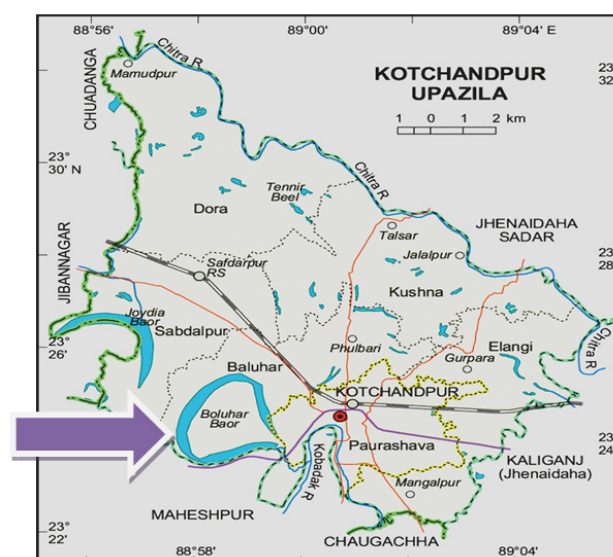
## METHODOLOGY

**Study area and duration:** This study was carried out in the Baluhar Baor at Kotchandpur Upazilla (sub-district) under the district of Jhenaidah, Bangladesh from February 2011 to July 2011. The location of the *baor* is 23°24' 4.14" north and 88°05' 8.20" east coordinates (Figure 1).

**Data collection:** Data were collected from randomly selected 50 licensed fishermen by personal interview with a well-structured questionnaire. Participatory rural appraisal (PRA) tool such as Focus Group Discussion (FGD) was conducted with the fishermen to get an overview of the management system of the Baluhar Baor and their socio-economic condition. After collecting the data from the fishermen cross-check interviews were conducted with key persons such as, Upazila Fisheries Officer (UFO) and the relevant NGO workers for confirmation of the information.

**Data Analysis:** All the collected data were summarized and scrutinized carefully and analyzed by MS Excel and then presented in textual, tabular and graphical forms to

understand the management system of the *baor* fishery and the socio-economic conditions of the fishermen in the study area.



**Figure 1:** Study area, the Baluhar Baor in Kotchandpur of Jhenaidah district, Bangladesh (Source: Banglapedia 2011)

## RESULTS AND DISCUSSIONS

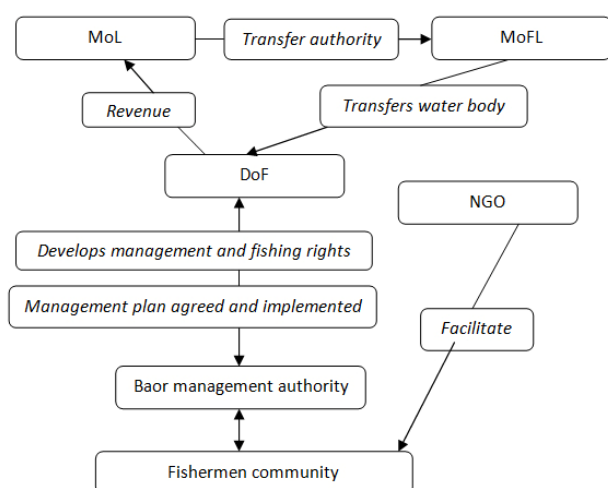
**Baor management project:** For increasing the fish production and uplift the socio economic condition of the people, a World Bank funded project entitled "Oxbow Lake Project-1 (OLP-1)" was implemented during 1979 to 2009. During this period, some steps were taken for developing infrastructure which also added new technology for fish culture. Under the project, hatchery and nursery ponds were constructed for producing fry by artificial breeding.

Baluhar Baor management project was transferred to revenue sector of Bangladesh government in 1986 and Department of Fisheries (DoF) of the Bangladesh government got the responsibilities to implement the project further. DoF was also responsible for negotiating the Ministry of Fisheries and Livestock (MoFL) for the ownership transfer of the water body from the Ministry of Land (MoL) (memo No.: IMA-103/78/248-JM since 15th February 1979).

**Baluhar Baor management:** There were six baors under the OLP-1 project named Baluhar Baor (Kotchandpur), Joydia Baor (Kotchandpur), Fatehpur Baor (Moheshpur), Kathgora Baor (Moheshpur), Morjat Baor (Moheshpur) and Bergobindopur Baor (Chougacha, Jessore). Among these *baors*, Baluhar was the largest occupying an area of 282 ha. There were six adjacent villages and fishermen living in these villages were fully depended on this *baor* for their livelihood. Only licensed fishermen were

permitted to harvest fish. License was issued by *baor* management authority. Mainly the *baor* was managed by the government of Bangladesh with the help of local fishermen.

**Baor management authority:** The authority involved in *baor* management was composed of a Manager, an Assistant Hatchery Officer, two Field Assistants and their 15 staff. The management authority along with government and non-government organizations managed all the activities relevant to the Baluhar Baor (Figure 2).



**Figure 2:** Model of the Baluhar Baor management under oxbow lake project (OLP) 1.

DoF was responsible for managing the *baor*. This organization has developed the management strategies and fishing rights of the *baor*. DoF ensured the involvement of *baor* management authority to implement the management policies. *Baor* management authority was directly involved for managing the *baor* and to communicate with fishermen community. Various NGOs were involved in providing training and credit facilities to fishermen community to generate alternative income sources to supplement fishing income.

**Infrastructural development:** At the initial stage of management project, communication and marketing system was not so developed. Various facilities e.g. electricity facilities, landing centre, ice plants, chilled room and others were absent. But under the present management significant infrastructural development was made in the study site (Table 1).

### Biological management

**Collection of fry:** A central hatchery in Kotchandpur Upazila was constructed which controlled by DoF as a part of *baor* management project. *Baor* authority collected fry from this hatchery as per their target. The

hatchery always maintained the quality of the fish fry. The brood fish for this hatchery was supplied by the *baor* authority that reared large brood fish in the *baor*. The fry production status of the central hatchery is summarized in Table 2. The production of hatchery was started in 1985 and it stopped after 2009. Fry production profile of this hatchery was satisfactory throughout its production period.

**Table 1:** Present infrastructural status

Infrastructures	Number
Residential building	2
Ice plant	1
Chill room	1
Fish landing centre	1
Water control system	1
Nursery pond	3

**Table 2:** Fish fry production status at central hatchery

Year	Fry production (million)		Earning (million BDT)	
	Target	Achieved	Target	Achieved
2007	0.7100	0.7560	1.6170	2.0357
2008	1.3100	1.2632	1.6570	1.7991
2009	0.1000	0.0520	1.6550	1.6204

**Stocking:** Stocking of the Baluhar Baor mainly depends on stocking of carp fish. Stocked species were Rui (*Labeo rohita*), Catla (*Catla catla*), Mrigal (*Cirrhina cirrhosus*) Silver carp (*Hypophthalmichthys molitrix*), Grass carp (*Ctenopharyngodon idella*) and common carp (*Cyprinus carpio*) were stocked by the *baor* management authority. Amount of fry stocking was depended on allocation of budget by the government. Stocking amount varied from year to year (Table 3).

**Table 3:** Stocking status of fish species in the Baluhar Baor

Scientific Name	Number	%
Silver carp, <i>Hypophthalmichthys molitrix</i>	255,000	34
Rohu, <i>Labeo rohita</i>	97,500	13
Catla, <i>Catla catla</i>	90,000	12
Mrigal, <i>Cirrhina cirrhosus</i>	90,000	12
Common carp, <i>Cyprinus carpio</i>	112,500	15
Grass carp, <i>Ctenopharyngodon idella</i>	105,000	14
Total	750,000	100

**Culture management:** After collection of fry they were stocked and reared at the nursery ponds. Between July and August in each year, the size of fingerlings reached at five to six inches and then they were released to the *baor*.

After releasing the fingerlings, growth rate was checked by random sampling. No supplementary feeds were supplied *i.e.* growth of stocked species was entirely dependent on natural foods.

**Restricted fishing period:** Fishermen can harvest *rani* fish (*rani* fish is a local term refers to all residential non-stocked finfish species in the *baor*) throughout the year. But, for stocked carp species, a pre-set harvesting schedule time, generally between November and June, was maintained. Outside this harvesting schedule, fishermen were not allowed to harvest the stocked species in the *baor*.

### **Social Management**

**Fishermen of the baor and formation of fishing group:** In the *baor* only licensed fishermen were permitted for harvesting of fish. The licensed fishermen lived in the adjacent villages of the *baor*. A total of 280 fishermen received licenses from the authority. Of them, 216 were allowed to harvest both stocked and *rani* fish species whereas remaining fishermen were engaged in the capture of only *rani* fish only. Fishermen who were allowed to harvest carps divided into 18 groups, each of 12 members with a group leader, responsible for collaboration with the *baor* management authority.

**Security at the baor:** Ten watchmen were employed for guarding the *baor*. In addition, eighteen guards were also worked on daily labor basis to protect fish from poaching. But the area of *baor* was so vast that it was very tough to protect the entire *baor* area. Fishermen of the *baor* performed this duty as a common obligation. At every day in each group, one or two members were acted as guard. They were deployed so that no fish poaching took place in the *baor*.

**Fishing license:** All of the fishermen who were permitted to harvest carp fish received their licenses from 1979 to 1986. After 1990, no new license was issued. Two types of license were provided by the government- one, for carp and *rani* fish harvesting and another, for harvesting of *rani* fish only. For renewing fishing license, each fisherman paid a fee annually. At the present, for renewing, BDT 400 and BDT 100 need to be paid to the government in a year for stocked (carps) and wild species harvesting, respectively.

**Fish harvesting methods:** Fishing (harvesting of carp species) started in November-December and completed on 30th June in each season. Date of fishing was fixed by *baor* authority was approved by General Manager of DoF. After fixing date, a schedule was prepared for fish harvesting on bi-monthly basis and was approved by Project Director. After getting permission, fishing was

carried out. All fishing activities were controlled by *baor* manager. Fishing was done by three ways *viz.* *komor* (brush shelters) fishing, *kochal* fishing (seining) and *chak* (triangle trap made by bamboo frame with net) fishing. These methods were also described by Biswas *et al.* (2009), Apu and Middendorp (1997) and Das and Bandayapaddaya (2000).

*Rani* fish was harvested round the year. Fishermen took all the money when they sold *rani* fish. The production of carp fish was 750 kg/ha in 2009 (MoFL 2009).

**Marketing system:** Each carp harvesting group participated in fishing operation and the value of harvested fish was determined on the basis of species weight. Harvested fish were sold to local consumers at a rate fixed by the government personnel. Fish were then transported to large *arot* (commission agent) in the town and sold in an auction in presence of the representative of *baor* manager and fishermen.

**Distribution of profit:** Under the management system, DoF provided all production inputs. Fishermen were participated with their net, boat, *komor* and labor. During distribution of share, government took sixty percent which in turn added to revenue sector and fishermen received forty percent share from the total fishing money.

### **Socio-economic status of the fishermen**

**Family type:** The family functions as a unit for income generation, consumption, reproduction and social interaction. In present study, two types of family pattern were found *i.e.* nuclear family and joint family. 58% fishermen families were joint family. Ali *et al.* (2009) found that 42.5% of the fish farmers lived in nuclear family and the rest (57.5%) in joint family in Mymensingh district which is more or less similar to the present findings. Das and Hossain (2004) and Hossain (2007) found joint families in maximum cases in Gazipur and Mymensingh district, respectively.

**Family size:** Family was categorized into small family (members up to 5), medium family (6 to 10 members) and very large family (10+ members). Small family was found in majority (48%) cases (Figure 3). Most of the fish farmers (45%) were belonging to the family member of 4 to 5 in Mymensingh district (Ali *et al.* 2009).

**Religion:** In an area religion has great impact on the socio-cultural activities of residence. It was found that all of the fishermen were belonging to the Hindu religion in the study area.

**Educational status:** Education status of majority fishermen was can sign only (37%) followed by fishermen

up to primary level (31%) and so on (Figure 4). Zaman *et al.* (2006) found 23.3 % illiterate among the fish farmers of the Mohanpur Upazila in Rajshahi district.

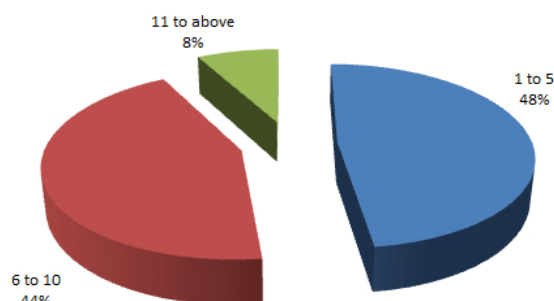


Figure 3: Different family size of the fishermen

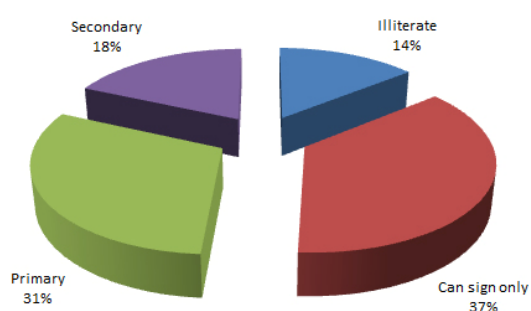


Figure 4: Educational status of the fishermen in the study area

Mahbubur (2001) reported that 68% of *haor* fishermen were illiterate, 28% up to primary level and 4% had only secondary level education. Shahriar *et al.* (2010) did not find a single fisherman from higher secondary education category or above in the Morgangi Beel area. The education policy of government and the leading NGOs should take this issue into account so that a proper strategy could be made. Unfortunately, the non-formal education facilities provided by different NGOs in other parts of the country were not found in these fishing communities.

**Housing condition:** In the study area houses of fishermen were of three main types: (i) *kancha* (earthen) (ii) tin shed and (iii) half building. Housing condition was dominated by *kancha* (74%) (Figure 5).

**Drinking water facilities:** The study showed that household (HH) of 100% fishermen used tube-well water for drinking and among them, 96% HH used owned tube-well, and remaining 4% used tube-wells belonging to others.

**Sanitary facilities:** Sanitary condition of the fishermen was observed very poor. Three types of toilet were found to be used by fishermen: (i) *kancha* (made of bamboo with

leaf shelter and inadequate drainage disposal), (ii) *semi-pucca* (made of brick with leaf or in tin shelter and inadequate drainage disposal) and (iii) *pucca* (made of brick with good drainage disposal). In the study maximum, 78% toilets were *kancha* (Figure 6). Shahriar *et al.* (2010) was found that 68% of toilets were *kancha* while 18% and 6% were *semi-pucca* and *pucca* and 8% of the fishers had no sanitary facilities in Morgangi Beel area. The present study revealed that the sanitary conditions of the fishermen were not satisfactory than that of fish farmers in Mymensingh district where Ali *et al.* (2009) in his study found that 62.5% of the farmers had *semi-pucca*, 25% had *kancha* and 12.5% *pucca* sanitary systems.

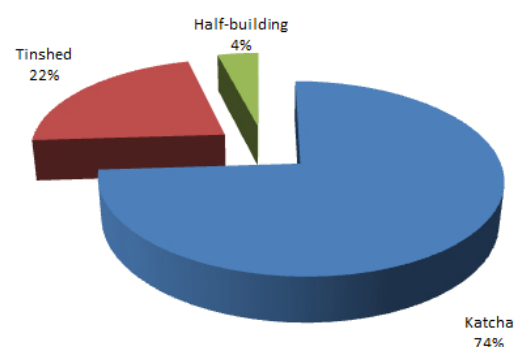


Figure 5: Housing condition of the fishermen in the study area

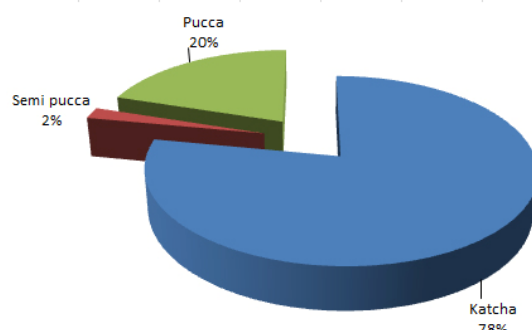
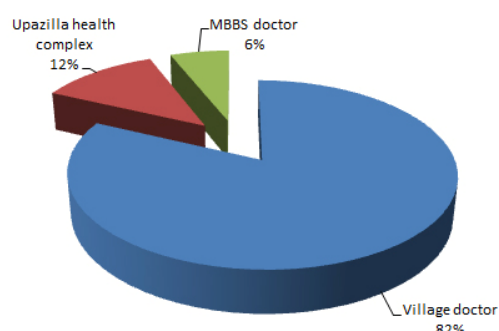


Figure 6: Sanitation facilities enjoyed by the fishermen

**Health facilities:** Health facilities that were enjoyed by the fishermen were not satisfactory at all. Health service status was categorized into three groups: village doctors, *upazila* health complex and MBBS doctors. Generally majority fishermen received health suggestions from village doctor, mostly unskilled. The highest proportion (82%) of fishermen depended upon village doctors (Figure 7). The health conditions of fishermen in studied area were very nuisance and worse than many other areas. Shahriar *et al.* (2010) found in the Morgangi Beel area health facilities of the fishers were better than the Baluhar Baor area where 64% of the fishermen's HHs were dependent on village doctors, 24% of the fishermen got health service from *upazila* health complex and



remaining 12% got health service from MBBS doctors. This difference could be due to low income the lack of knowledge of the fishermen concerned.



**Figure 7:** Source of health facilities for the fishermen

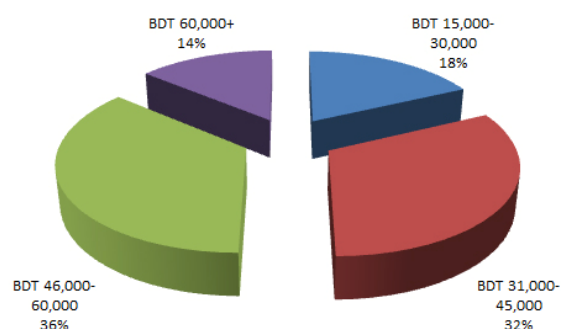
**Electricity facility:** There were 92% fishermen connected with electricity line and only 8% fishermen were not connected with electricity line. Kostori (2012) reported 48% fishermen had no electricity facility in a community of Chalan Beel under Tarash Thana in Sirajganj district. The electricity facility of Baluhar Baor fishermen community was good due to supply of electricity has been increased in Bangladesh.

**Land holding status:** Majority (58%) of fishermen had only 0.001-0.041 ha land while, 22% fishermen had 0.042-0.082 ha land, 6% fishermen had 0.083-0.123 ha land, 6% fishermen had 0.124-0.164 ha land and 12% of them had above 0.164 ha land. Shahriar *et al.* (2010) found that the average homestead area of the fishers is 0.003 ha in Jamalpur district.

**Annual income:** Annual income of the fishermen varied from BDT 15,000 to BDT 60,000+. The selected fishermen were grouped into four categories based on the level of annual income and majority (40%) had an annual income of BDT 46,000-60,000 (Figure 8). Mean annual income was found BDT 43,800±15,018. Flowra *et al.* (2009) found that the income of a fisherman community of the Dahia Beel under Natore district was BDT 51 to 75 daily (annually BDT 18,600 to 27,400).

Shahriar *et al.* (2010) found that annual incomes of the fishermen of Morgangi Beel area under Melandah Upazila of Jamalpur district were varied from BDT 21,000 to 100,000. According to him it was found that about 40% of the fishermen had annual income between BDT 24,000 to 36,000 and 32% of the respondent had income in the ranged BDT 36,001 to 48,000. Hossain (2007) indicated that fishermen in Kaliakoir Upazila under Mymensingh district had annual income ranging from to BDT 24,000 to 40,000. Annual income ranges of Baluhar Baor fishermen are slightly higher than that of fishermen of Morgangi

Beel and Kalikoir Upazila. This may be due to the higher availability of fish for catching in the Baluhar Baor.



**Figure 8:** Annual income of the fishermen

## CONCLUSION

The co-management system of Baluhar Baor influencing the socio-economic conditions of surrounding fishermen was not satisfactory. The fishermen were deprived of many amenities. Fish production and fish fauna of the *baor* was being drastically reduced due to environmental and human intervention such as over fishing, siltation, use of banned gear like very small mesh size fishing nets, indiscriminate use of gears and as a whole due to absence of proper management policy. The government should take initiative on proper licensing system for the genuine fishermen, involvement of GO and NGOs for training them to improve their socioeconomic condition and incorporation of lion's share for the fishers in the management process.

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